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PhD 2009 to 2012

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Ecology and microbiology of black band disease: New insights into the etymology of an old coral disease

Yui Sato completed his BSc degree in Japan before enrolling in a Master of Science degree at JCU, this was upgraded to PhD and successfully completed in 2012. Since then, Yui has held a postdoctoral research position at AIMS.

Coral reefs currently represent one of the most vulnerable ecosystems on Earth. Alarming rates of decline over the past century have been attributed to a number of factors, including coastal development, over-harvesting and pollution, and more recently, mass coral bleaching events and outbreaks of emerging diseases. However, knowledge of most coral diseases has been limited and epizootic dynamics; host population impacts; causative agents; transmission modes; and specific environmental drivers are poorly understood.

Yui's PhD research significantly contributed to better biological understanding of one of the most important coral diseases affecting corals around the world, his thesis addressed the ecology and microbiology of black-band-disease (BBD), a virulent infectious disease affecting coral reefs globally, including the Great Barrier Reef. He identified important environmental factors causing seasonal outbreaks and changes in microbial communities that lead to disease development.

Based on Yui's studies of the in situ development of BBD, a model of its pathogenesis was developed for the first time. The model demonstrates that successive changes in key members of initial microbial community associated with a precursor stage of BBD lead to the development of a complex polymicrobial consortium that provides ideal conditions for sulphide production and the development of anoxic conditions which together cause coral tissue loss. Knowledge derived from this study provides new insights into the microbial ecology of BBD, contributing to a better mechanistic understanding of BBD pathogenesis that is vital for any future development of management strategies to mitigate the impacts of BBD on coral reef ecosystems.



Publications

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Publications cont.

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